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IS 2091 (1983): Multi-trip glass beer bottles [CHD 10: Glassware]



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IS : 2091 - 1983
(Reaffirmed 2008)

Indian Standard
SPECIFICATION FOR
MULTI-TRIP GLASS BEER BOTTLES
(Second Revision)

Second Reprint MARCH 1997

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AMENDMENT NO. 2 JULY 2007
TO
IS 2091 : 1983 SPECIFICATION FOR
MULTI-TRIP GLASS BEER BOTTLES

(Second Revision)

(Page 5, clause 6.6) — Substitute the following for the existing clause:

'6.6 Limit of Alkalinity — The glass of the bottle shall conform to Class HGB 3 of the glass when graded and tested according to the method prescribed in IS 2303 (Part 1/Sec 1) : 1994[‡].'

(Page 5, footnote marked ‡) — Substitute the following for the existing:

[‡]Grading glass for alkalinity : Part 1 Hydrolytic resistance, Section 1 Hydrolytic resistance of glass grains at 98°C Method of test and classification (*first revision*).'

AMENDMENT NO. 1 NOVEMBER 2005
TO
IS 2091:1983 SPECIFICATION FOR MULTI-TRIP
GLASS BEER BOTTLES
(Second Revision)

(Page 6, clause 6.8) — Insert the following at the end:

'6.9 Bottle Washing

All bottles shall be thoroughly cleaned immediately before filling by automatic/semi-automatic washing machines. Washing shall be accomplished by pre-rinse and final rinse. For final rinse dechlorinated potable water shall be used. Bottles should be thoroughly drained after final rinse so that strength of liquor is not affected after filling. Water jets in the washing machine should be so designed and jet pressure so maintained as to thoroughly rinse the whole internal and external surface area of the bottles. Wash water in the bottle washer should be thoroughly drained and changed frequently to prevent algal growth.

6.9.1 Wherever second hand bottles are being used, all the bottles should be pre-washed prior to feeding to the bottle washer. This should be done in the following manner:

- a) Pre-rinse first soaking in a tank to remove labels and other extraneous matter.
- b) Rinse in the second tank with hot water around 60°C and 3 percent caustic solution at 60°C using brushes to clean the interior and exterior of bottles thoroughly.
- c) Final rinse in the third tank with potable water.
- d) Feed the bottles to bottle washer.'

Indian Standard
SPECIFICATION FOR
MULTI-TRIP GLASS BEER BOTTLES
(Second Revision)

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(Continued on page 2)

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IS : 2091 - 1983

(Continued from page 1)

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Indian Standard
SPECIFICATION FOR
MULTI-TRIP GLASS BEER BOTTLES
(Second Revision)

0. FOREWORD

0.1 This Indian Standard *Second Revision* was adopted by the Indian Standards Institution on 30 March 1983, after the draft finalized by the Glass Containers Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 This standard was first published in 1962 and subsequently revised in 1973. In the present revision the requirements of overall height and diameter, and their tolerances have been specified to reduce the variety in size of bottles used by different distillers in the country. The details of neck finish have been referred to in IS : 7511-1973*. Fire finishing requirement for sealing surface has been substituted by closure integrity along with other modification in the standard.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1969†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and tests for multi-trip glass beer bottles.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definition given in IS : 6654-1982‡ shall apply.

3. CAPACITIES

3.1 The beer bottles shall be of the following nominal capacities:

a) 650 ml, and

b) 325 ml.

*Summary sheet on glass containers neck finishes.

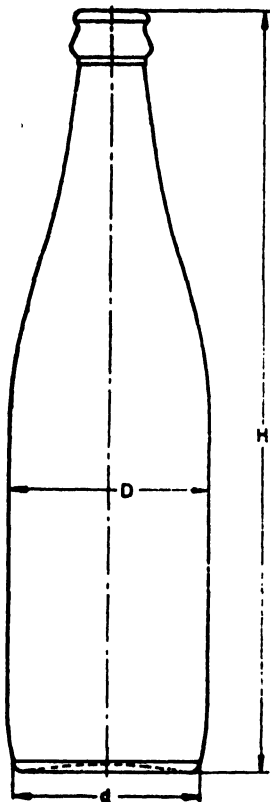
†Rules for rounding off numerical values (*revised*).

‡Glossary of terms relating to glass containers (*first revision*).

4. NECK FINISH AND DIMENSIONS

4.1 The bottles shall be of crown closure finish as given in Table 5 of IS : 7511-1974*.

4.2 Shape and Dimensions — The shape and dimensions of the bottles shall be as given in Fig. 1.



<i>Nominal Capacity</i>	<i>D</i>	<i>d</i>	<i>H</i>
ml	±1.5		±2
650	75.0	68.6	283.0
325	63.0	60.1	220.0

All dimensions in millimetres.
FIG. 1 DIMENSIONS OF BEER BOTTLE

*Summary sheet on class containers neck finishes.

5. SAMPLING

5.1 Representative samples of glass beer bottles shall be drawn as prescribed in Appendix A.

6. REQUIREMENTS

6.1 Material and Workmanship — The bottles shall be made from amber coloured glass and have a smooth surface without cracks, pinholes, sharp edges or broken bubbles. They shall be free from cords, blisters, stones, and as far as possible free from loading marks.

6.1.1 The bottles shall be well formed with a uniform distribution of glass all over the walls and the base, avoiding any wedge at the bottom.

6.2 Annealing — The bottles shall be well annealed and shall not contain strain more than that shown by standard strain disc No. 4, when examined by the method given in IS : 9153-1978*.

6.3 Brimful Capacity — The brimful capacities of the bottles where tested by the method given in IS : 10497-1983† shall be as follows:

<i>Nominal Capacity</i>	<i>Brimful Capacity</i>	<i>Tolerance</i>
ml	ml	ml
650	670	±7
325	340	±4

6.4 Vertically Tolerance — The shape of the bottle shall be such that when kept on a flat surface the sealing surface shall be parallel to the base. Also a vertical line through the centre of the circle formed by the inside neck opening shall pass through the centre of the circle described by the bottom resting surface. The maximum permissible variation in verticality when tested according to the method given in Appendix B shall be 1.5 mm.

6.5 Closure Integrity — All sealing surfaces shall be essentially smooth and free from features that prevent adequate sealing.

6.6 Limit of Alkalinity — The glass of the bottle shall conform to Type 4 of the glass when graded and tested according to the method prescribed in 2 of IS : 2303-1963‡.

*Methods of polariscopic examination of glassware.

†Method of test for the determination of brimful capacity of glass containers by gravimetric method.

‡Method of grading glass for alkalinity.

6.7 Thermal Shock Test — The bottles shall pass the test when tested by Method A (range) prescribed in IS : 6506-1972*, with the temperature difference range ($t_1 - t_2$) of 45°C.

6.7.1 The sample shall be taken to have satisfied the requirements of the test if the bottles show no visible crack after the test.

6.8 Hydrostatic Pressure Test — The bottles shall withstand a pressure of 1 MPa (10 kgf/cm²) when applied for a duration of 1 minute $\pm$ 2 seconds. The test shall be conducted as prescribed in Appendix C.

7. PACKING AND MARKING

7.1 Packing — The bottles may be packed as recommended in 3.1 of IS : 6945-1973† or as agreed to between the purchaser and the supplier.

7.2 Marking — The beer bottles shall be permanently and legibly marked on its surface with the following information:

- a) Manufacturer's name or registered trade-mark, if any;
- b) Nominal capacity followed by letters 'ml'; and
- c) Any other information as specified by the purchaser.

7.3 BIS Certification Marking

The product may also be marked with Standard Mark.

7.3.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

APPENDIX A

(Clause 5.1)

SAMPLING PROCEDURE FOR GLASS BEER BOTTLES

A 1. SCALE OF SAMPLING

A-1.1 Samples to determine the conformity of a consignment of beer bottles to this specification shall be selected in accordance with the procedure described in A-1.2 to A-1.4.1. However, the purchaser and the supplier may agree to adopt any other procedure.

*Methods of thermal shock tests on glassware.

†Code of practice for packaging glass and glassware.

A-1.2 Lot — All the bottles of the same nominal capacity produced under essentially the same conditions of manufacture shall be separated in groups of 10 000 bottles or less. Each such group shall constitute a separate lot.

A-1.3 Samples shall be taken from each lot for ascertaining conformity of the bottles to the requirements of this specification.

A-1.4 Test Samples — A sample of 223 glass beer bottles shall be selected at random from each lot. To ensure randomness of selection, the procedure given in **A-1.4.1** is recommended for use in case the purchaser and the supplier have not agreed any other alternative method.

A-1.4.1 Arrange the bottles in the lot in a systematic manner and starting from any one, count them as 1, 2, ..., up to r and so on where r is the integral part of $N/223$ (N being the number of bottles in the lot). Every r th bottle thus counted shall be withdrawn to constitute the test samples for the particular lot.

A 2. CRITERIA FOR CONFORMITY

A-2.1 Out of the 223 test samples selected according to **A-1.4.1** two test samples shall be subjected to alkalinity test (*see* 6.6). If test results show that the glass conforms to the requirements of this specification then only further testing need be done to examine the conformity of the lot to other requirements. If the test result fails to satisfy the requirements the lot shall be rejected without further testing.

A-2.2 From the remaining 221 test samples, any 10 shall be chosen and subjected to thermal shock test (*see* 6.7). Any sample not satisfying the requirement of the test shall be considered as defective.

A-2.2.1 If the number of defectives among the 10 samples tested for thermal shock is not more than one, the lot shall be subjected to further tests, otherwise the lot shall be rejected without further tests. Non-defective samples in the thermal shock test shall be mixed with the remaining samples selected according to **A-1.4.1**.

A-2.3 From the remaining 211 test samples any 10 shall be chosen and subjected to hydrostatic pressure test (*see* 6.8). Any sample not passing the requirements of the test shall be considered defective.

A-2.3.1 If the number of defective samples for hydrostatic pressure test is not more than 1 the lot shall be subjected for further tests otherwise, the lot shall be rejected without further testing.

A-2.4 Tests for ascertaining the conformity of the lot to the requirements laid down in **4.1**, **4.2** and **6.1** to **6.5** shall be carried out in stages by taking 30 test samples at each stage out of the number of the remaining test samples and a decision taken in accordance with the directions given in **A-2.4.1** to **A-2.4.4** read with Table 1. When a decision is reached at any stage of testing further samples need not be tested. Any sample not satisfying the requirements of **4.1**, **4.2** and **6.1** to **6.5** shall be considered as a defective one.

A-2.4.1 The first stage of testing shall consist of selection of 30 test samples at random from the total number of test samples and testing them individually for the requirements given in **4.1**, **4.2** and **6.1** to **6.5**.

A-2.4.2 If the number of defectives found is less than or equal to the corresponding number (which is 0 at the first stage), the lot shall be accepted without any further testing.

A-2.4.3 If the number of defectives found is greater than or equal to the corresponding rejection number (which is 4 at the first stage), the lot shall be rejected without any further testing.

A-2.4.4 If the number of defectives found is between the corresponding acceptance and rejection numbers, another 30 test samples shall be examined. The total number of defectives in the combined sample (that is, the number of defectives in the first and second stages of testing put together) shall then be compared against the acceptance and rejection numbers at the second stage of testing. If no decision is arrived at by the procedures similar to those given in **A-2.4.2** or **A-2.4.3**, testing shall be carried to third stage and so on up to the seventh stage till a decision is finally reached.

TABLE 1 CRITERION FOR CONFORMITY AT DIFFERENT STAGES OF TESTING

(Clause A-2.4)

STAGE	NUMBER OF TEST SAMPLES	SIZE	FOR CUMULATIVE ACCEPTANCE NUMBER	TEST SAMPLES REJECTION NUMBER
(1)	(2)	(3)	(4)	(5)
First	30	30	0	4
Second	30	60	2	5
Third	30	90	3	8
Fourth	30	120	4	9
Fifth	30	150	6	10
Sixth	30	180	8	12
Seventh	30	210	11	12

APPENDIX B

(Clause 6.4)

TEST FOR VERTICALITY OF BOTTLES

B-1. ASSEMBLY

B-1.1 Assembly for the determination of verticality shall be as shown in Fig. 2.

B-2. PROCEDURE

B-2.1 Fill the bottle with water in order to give in more stability and place it on its base on the flat plate having a shaft bolted to it at right angles. Adjust 'V' block mounted on the shaft in such a manner that it is in contact with the outer diameter of the bottle at about the middle. Adjust the dial indicator fitted to the shaft so that its measuring point comes in contact with the outer edge of the neck of the bottle. Rotate the bottle, keeping the body always in contact with the 'V' block. Note down the maximum deflection on the indicator.

B-2.1.1 The verticality is expressed as half the difference between the maximum and minimum readings of the dial indicator obtained during rotation of the bottle through 360°.

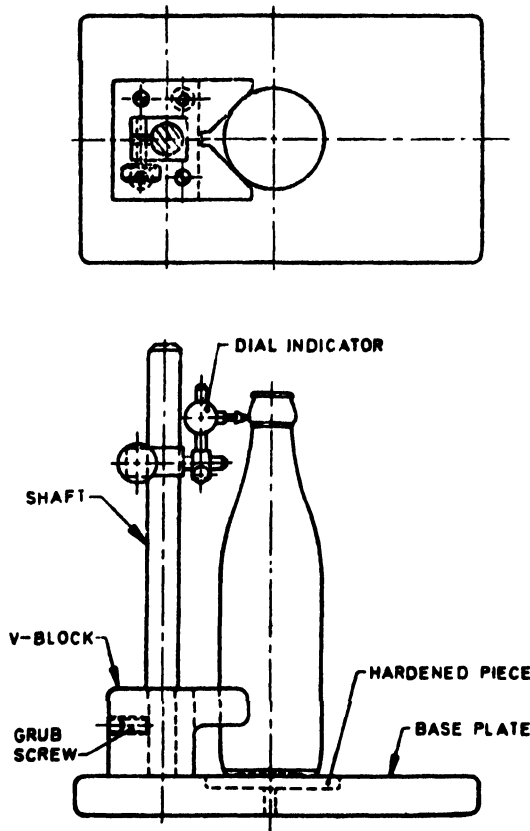


FIG. 2 ASSEMBLY FOR TESTING VERTICALITY OF BOTTLE

APPENDIX C

(Clause 6.8)

HYDROSTATIC PRESSURE TEST

C-1. APPARATUS

C-1.1 A suitable type of apparatus embodying the following principles shall be used.

C-1.1.1 The bottle to be tested shall be held by a split collar so designed that the bottle is not clamped but is suspended from the bead of the finish.

C-1.1.2 A seal shall be provided which shall be water-tight at the pressure to be applied.

C-1.1.3 The apparatus shall be so designed that it is possible to pump water into the bottle through a non-return valve and the pressure indicated on a suitable pressure recorder.

C-1.1.4 An automatically controlled timing mechanism shall be built into the apparatus so that pressure is applied for 1 minute $\pm$ 2 seconds.

C-2. PROCEDURE

C-2.1 Fill the bottle with water at room temperature. Hold it by the split collar and then seal. Apply a pressure of 1 MPa (10 kgf/cm²) for a period of 1 minute $\pm$ 2 seconds.

C-2.1.1 A bottle which withstands the pressure without bursting shall be considered to have passed the test.

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